

In the Remarks

The Applicants have amended Claim 1 to recite that the differential Young's modulus at 3-10% extension is no more than 6.6 cN/dtex and the CF value is 1-30. The CF value was contained in original Claim 11, which has now been cancelled. Claim 12 has been amended to correct the dependency. Support for the 6.6 cN/dtex limitation may be found in Table 1 on page 25 of the Applicants' Specification at Example 4, wherein the cN/dtex value is stated as being 6.6. It is well accepted that selecting a value supported by an Example within a broader range supported elsewhere in the Specification provides ample support for the above differential Young's modulus.

Claim 15 has been amended to recite an additional step of an interlacing treatment to make the CF value 1-30. Support may be found on page 8 at line 30, original Claim 11 and elsewhere.

The Applicants acknowledge the rejection of Claims 1 – 14 under 35 U.S.C. §112, second paragraph. As noted above, the Applicants have amended Claim 1 to add the structural limitation of the CF value being 1-30. The Applicants respectfully submit that this structural limitation provides the appropriate structural limitation sought in the Official Action and assists in differentiating Claim 1 over Fujimoto for reasons set forth in detail below.

Moreover, the Applicants respectfully submit that it is well accepted that physical characteristics such as Young's modulus, elastic recovery, CF value and the like, coupled with structure such as a polyester multi-filament yarn comprising polytrimethylene terephthalate filaments satisfies the requirements of §112. Withdrawal of the rejection is respectfully requested.

Turning now to the merits, the Applicants acknowledge the rejection of Claims 1 – 13 under 35 U.S.C. §§102 and 103 based on Fujimoto. However, Fujimoto fails to disclose, teach or suggest a minimum value of a differential Young's modulus at 3-10% extension of no more than 6.6 cN/dtex

and a CF value of 1-30. Careful scrutiny of the entire Fujimoto document reveals that such disclosure does not exist in Fujimoto. For this reason alone, the Applicants respectfully submit that Fujimoto is inapplicable under both of §§102 and 103.

The Applicants enclose an English translation of an Experimental Report of Jinichiro Kato, one of the named inventors in Fujimoto to further support patentability. The Experimental Report was submitted in the Taiwan Patent Office with a Chinese translation by the Applicant (Asahi Kasei Corp.) of WO 99/27168/EP '422 to Fujimoto to support their argument in an opposition proceeding to the Taiwanese counterpart of the present application. The independent claim of the opposed Taiwan counterpart of the application was limited to "a minimum value of a differential Young's modulus at 3-10% extension is no more than 10 cN/dtex". The opponent submitted the experimental report in which they certified that the yarn obtained in Example 5 of Fujimoto had a minimum value of a differential Young's modulus at 3-10% elongation of 8 cN/dtex.

The English translation of the Experimental Report reveals that the yarn obtained in Example 5 of Fujimoto has a minimum value of a differential Young's modulus at 3-10% elongation of 8 cN/dtex. Thus, the Applicants respectfully submit that the Applicants of Fujimoto has himself certified that the minimum value of a differential Young's modulus at 3-10% extension is substantially in excess of the maximum 6.6 cN/dtex as recited in Claim 1. The Applicants respectfully request withdrawal of the rejection based on Fujimoto alone.

Claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over Fujimoto in view of Matsuo (JP 11-100747). The Applicants respectfully submit that even if the hypothetical combination of Matsuo with Fujimoto with respect to Claim 14 is made, the resulting combination still fails to teach or suggest the minimum value of a differential Young's modulus at 3-10%

extension of no more than 6.6 cN/dtex. Withdrawal of the rejection based on the hypothetical combination of Matsuo with Fujimoto is respectfully requested.

Claims 15 – 23 are rejected under U.S.C. §103(a) as being unpatentable over Fujimoto in view of Schippers. However, Schippers also does nothing to cure the deficiencies set forth above with respect to Fujimoto. Accordingly, even if the hypothetical combination is made, the resulting combination still fails to teach or suggest the minimum value of a differential Young's modulus of 3-10% extension of no more than 6.6 cN/dtex. Moreover, there is utterly nothing in either of Fujimoto or Schippers that teaches or suggests an interlacing treatment subsequent to a relaxation heat treatment that would cause the yarn to have a CF value of 1-30.

The Applicants invite the Examiner's attention to Fig. 2, which shows a method employing an interlacing nozzle in the relaxation heat treatment. By use of the interlacing treatment, it is possible to lower the yarn tension prior to interlacing so that, by utilizing the shrinkage stress produced by the heat of the second heated roller 5, it is possible to perform a relaxation heat treatment between the second heated roller 5 and the interlacing nozzle 7. As a consequence, the relaxation factor can be controlled by varying the actuating air pressure of the interlacing nozzle.

Thus, the CF value is quite important for a polyester multifilament yarn comprising polytrimethylene terephthalate filament to decrease yarn breakage since friction with metals or ceramics at any process point of yarn production and weaving is too high because of the molecular structure. The Applicants respectfully request withdrawal of the rejection of Claims 15 – 23 based on the hypothetical combination of Schippers with Fujimoto.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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EXHIBIT 5

June 5, 2002

Experimental Report

4960, Nakakawara-cho 5,
Nobeoka-shi, Miyazaki-ken,
Asahi Kasei Corporation
Nobeoka Laboratory,
Fiber-Technology Laboratories
Jinichiro KATO

I certify that I conducted the following experiments

1. Object of experiment

It is the object of the experiment to certify that the polymethylene terephthalate fiber disclosed in EXHIBIT 1 (Internationa Pubulication No WO99/27168) is identical to that of this invention.

2. Person who conducted the experiment

The Fiber-Technology Laboratories, Asahi Kasei Corporation

Section Chief Jinichiro KATO

3. Term of experiments

From April 1, 2002 to April 26, 2002

4. Method of Experiments

A. Method of fiber production

Torimethylene terephthalate polymer having intrinsic viscosity of 1.0 was obtained by the method described in Example 1 of EXHIBIT 1. A yarn of the specified dtex/filaments was obtained by spinning the polymer under the condition of Table 1 (the conditions described in EXHIBIT 1: note below) and the yarn was provided to the experiment.

In this experiment, Jinichiro KATO, one of the inventors of EXHIBIT 1, produced the fiber under the conditions of Table 1 with the spinning apparatus used in EXHIBIT 1.

Table 1: Spinning conditions

	Intrinsic viscosity	Temperature of duct	Temperature of Roll		Periphery speed of roll		Winding speed	Draw ratio	Relaxation ratio
			First	Second	First	Second			
	[η]	°C	°C	°C	m/min	m/min	m/min		%
Example 5	1.0	30	50	140	1840	4600	4300	2.5	6.5

B. Method of measurements

The following properties of the obtained yarn were measured by the methods described in the specification of TW-A-477837. Items are tensile strength/elongation, Young's modulus, differential Young's modulus, recovery ratio following 10%.

elongation.

The obtained results are shown below.

Table 2: Properties of fiber

	Tensile strength	Tensile elongation	Young's modulus	Differential Young's modulus	Recovery ratio following 10% elongation	Cristalinity	CV value
	cN/dtex	%	cN/dtex	cN/dtex	%	%	%
Example 5	3.8	34.5	21	8	100	61.4	3.8

The differential Young's modulus was obtained from the differential Young's modulus (Figure 2) from the S-S curve (Figure 1) obtained by the reproduction of Example 5 of EXHIBIT 1.

- Comparison between the claimed features of this invention and the technical features of EXHIBIT 1

Comparison between the claimed features of this invention and EXHIBIT 1 is shown in Table 3.

Table 3

Claimed features of this application				EXHIBIT 1
Claim 1	(1)	Fiber	PTT	PTT
	(2)	Tensile strength	3 cN/dtex or higher	3.8 cN/dtex
	(3)	Young's modulus	25 cN/dtex or lower	21 cN/dtex
	(4)	Minimum differential Young's modulus at 3-10% elongation	10 cN/dtex or lower	8 cN/dtex
	(5)	Recovery ratio following 10% elongation	90% or higher	100%
Claim 2	(6)	Clistalinity	30% or higher	64.1%
Claim 3	(6)	CV value	5% or lower	3.8%

- Conclusion

I confirmed that the fiber obtained by the reproduction of Example 5 of EXHIBIT 1 meets all of claims 1-3. Accordingly, it is confirmed that this invention is identical to EXHIBIT 1 and is not novel.

Figure 1. S-S curve

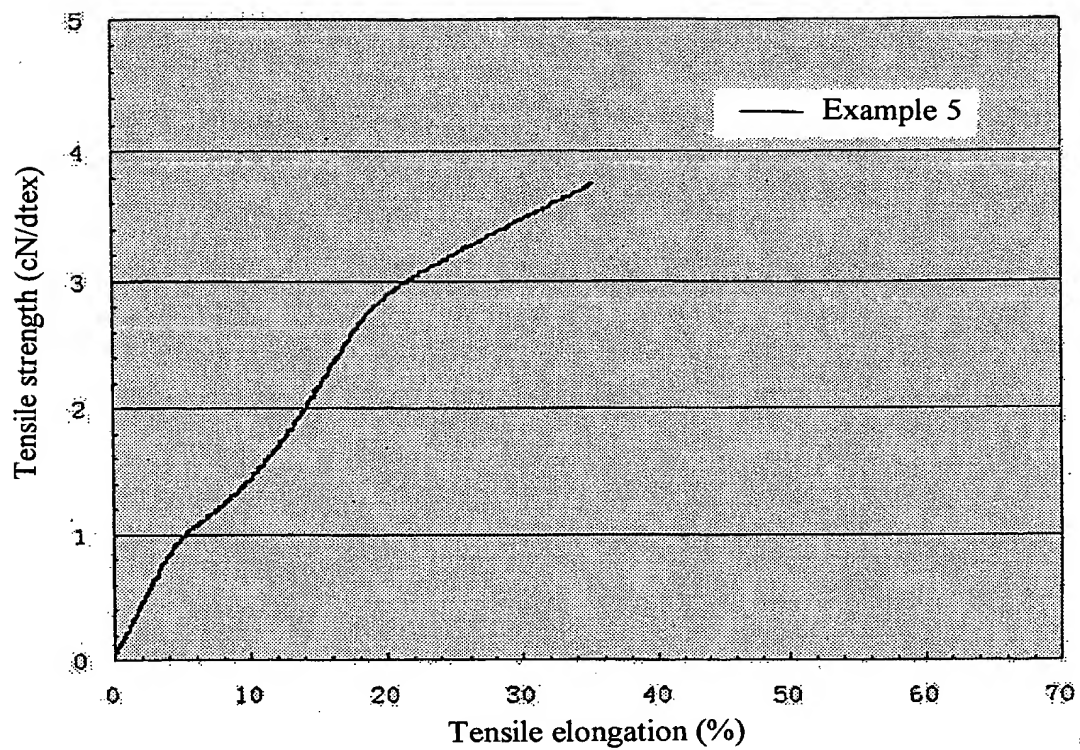
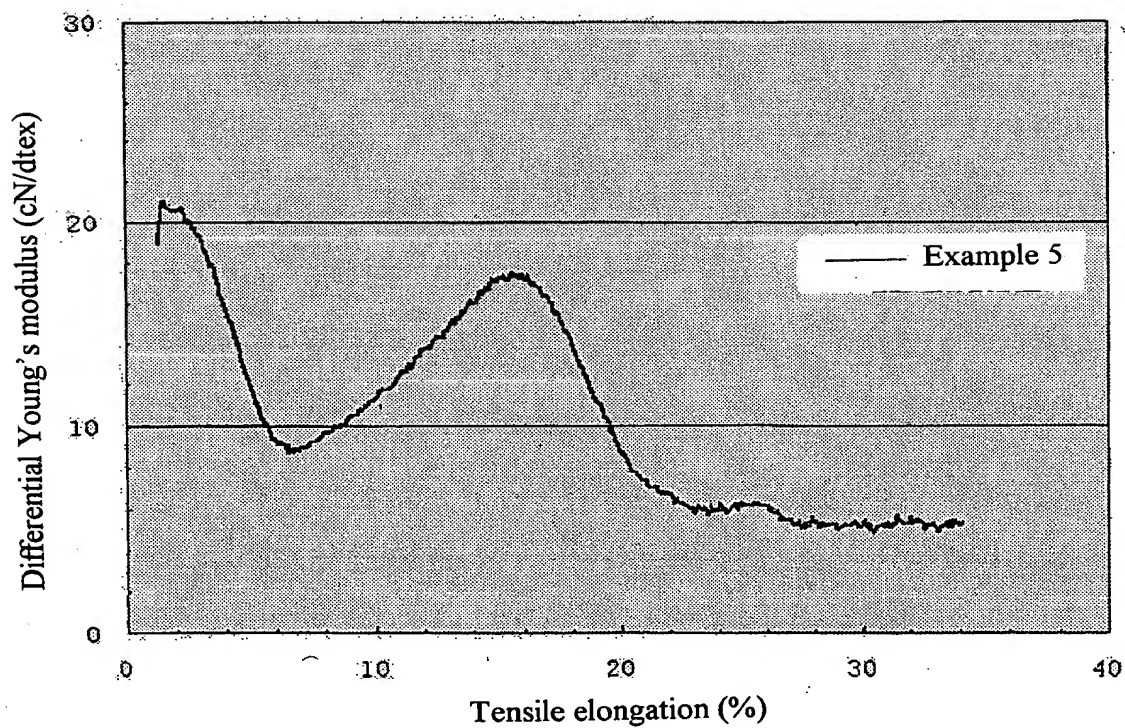


Figure 2. Differential Young's modulus



Certification

I certify that this experimental report is the experimental results conducted by Jinichiro KATO, Nobeoka Laboratoty, Fiber-Technology Laboratories, Asahi Kasei Corporation, on June 7, 2002.

June 5, 2002

Asahi Kasei Corporation
General Manager
Fiber-Technology Laboratories
Teruhiko Matsui

2002年 6月 5日

実験報告書

宮崎県延岡市中川原町 5 - 4 9 6 0

旭化成株式会社

繊維技術研究所 延岡研究室

加藤 仁一郎

以下の通り実験を行ったことを証明します。

記

1. 実験の目的：

甲1号証（国際公開番号W/O 99/27168）－実施例5に記載されたポリトリメチレンテレフタレート繊維が、本件発明のポリトリメチレンテレフタレート繊維と同一であることを証明する。

2. 実験者

旭化成株式会社 繊維技術研究所

課長

加藤仁一郎



3. 実験期間

2002年 4月1日 ～ 同年4月26日

4. 実験方法

A. 繊維製造方法

甲1号証－実施例1に記載された方法にて極限粘度1.0のポリトリメチレンテレフタレートポリマーを得た。該ポリマーを表1の条件（甲1号証－実施例5記載の条件：下記参照）で紡糸を行い、所定のデシテックス／フィラメントの繊維を得て、これを測定用試料とした。

尚、本実験は、甲1号証の発明者の一人である加藤仁一郎が、甲1号証の発明に用いた紡糸設備を用い、表1の条件で繊維を製造したものである。

表1：紡糸条件

	極限	保溫筒	ロール温度		ロール周速度		巻き取り速度	延伸倍率	弛緩率
	粘度	温度	第一	第二	第一	第二			
	[η]	℃	℃	℃	m/min	m/min	m/min		(%)
実施例5	1.0	30	50	140	1840	4600	4300	2.5	6.5

B. 測定方法

得られた繊維を台湾公告477837号明細書に記載の方法で以下の物性を測定した。項目は 強伸度、ヤング率、微分ヤング率、10%伸長弾性回復率、結晶化度、CV値 である。

得られた測定結果を表 2 に示す。

表 2：繊維物性

	強度	伸度	ヤング 率	微分ヤン グ率	10%伸長 回復率	結晶 化度	CV 値
	cN/dtex	%	cN/dtex	cN/dtex	%	%	%
実施例 5	3.8	34.5	21	8	100	61.4	3.8

なお、微分ヤング率は甲 1 号証－実施例 5 の追試により得られた PTT 繊維の S－S 曲線図（図 1）、該 S－S 曲線図から微分ヤング率（図 2）より求めた。

5. 本件構成要件と甲 1 号証との技術構成の対比

本件構成要件と甲 1 号証との対比を表 3 に示す。

表 3

本件構成要件				甲 1 号証
請求 項 1	(1)	対象繊維	PTT	PTT
	(2)	強度	3 cN/dtex 以上	3.8 cN/dtex
	(3)	ヤング率	25 cN/dtex 以下	21 cN/dtex
	(4)	伸度 3～10%での微分 ヤング率の最小値	10 cN/dtex 以下	8cN/dtex
	(5)	弾性回復率(10%伸長 時)	90%以上	100%
請求 項 2	(6)	結晶化度	30%以上	64.1%
請求 項 3	(6)	CV 値	5%以下	3.8%

6. 結論

表 3 に示すように、甲 1 号証実施例 5 の追試により得られた繊維は本件請求項 1～3 を全て満たすことを確認した。従って、本件発明は甲 1 号証と同一であり、新規性がないことが確認された。

証 明 書

この実験報告は旭化成株式会社繊維技術研究所延岡研究室 加藤仁一郎が2002年6月7日に繊維技術研究所にておこなった実験結果であることを証明する。

2002年 6月 5日

旭化成株式会社
繊維技術研究所長

松尾 輝彦



図1. S-S曲線図

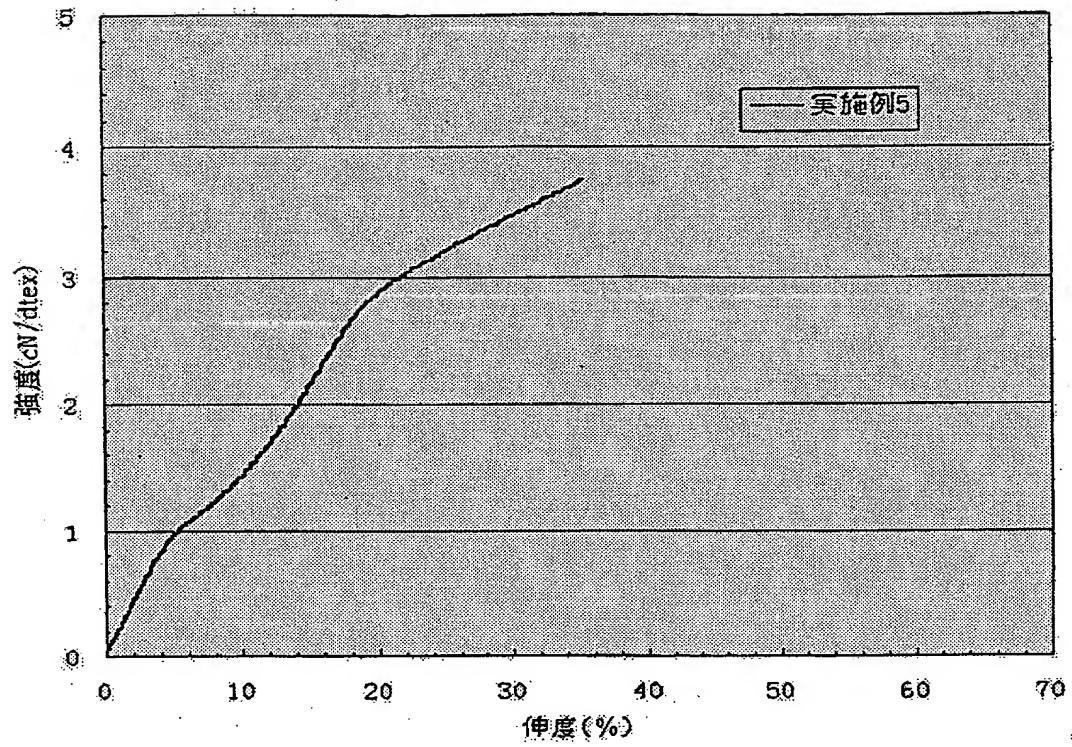
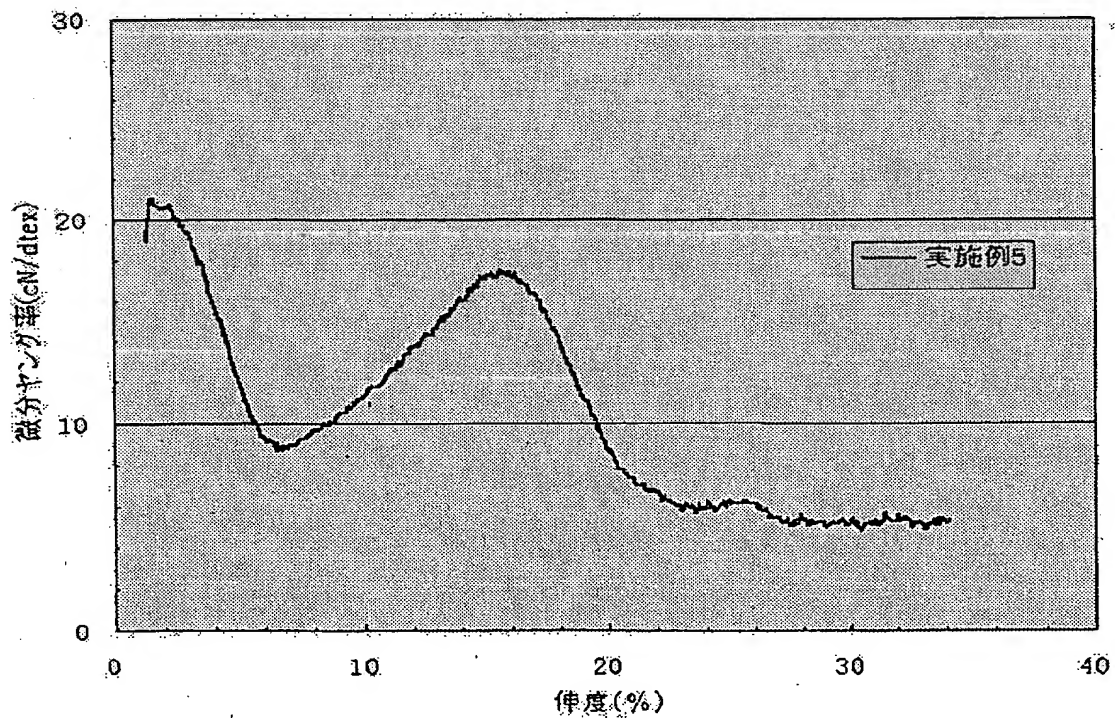


図2. 微分ヤング率



證據五實驗報告書之相關部份中譯文

1、實驗目的

證明證據一（國際公開號 WO99/27168）之實施例五所記載之聚對肽酸丙二醇酯纖維與被異議案（台灣公告號 477837 號）所使用之聚肽酸丙二醇酯纖維係屬相同之纖維。

3、實驗期間

2002 年 4 月 1 日至 2002 年 4 月 26 日

4、實驗方法

A、纖維製造方法

依證據一實施例依所記載之方法製得固有黏度 1.0 之聚對肽酸丙二醇酯聚合物。將該聚合物依表 1 之條件（證據一-實施例 5 所記載之條件，如下記內容）進行紡紗，製得具有特定分特（dtex）/紗之纖維，並以其作為測試用材料。

又，本實驗，係由證據一發明之發明人之加藤仁一郎先生，使用證據一發明中所使用之紡紗設備，依表 1 條件所製得者。

表 1：紡紗條件

	固有黏度	保溫筒溫度	滾筒溫度		滾筒周速度		捲取速度	延伸倍率	鬆弛率
			第一	第二	第一	第二			
	[η]	℃	℃	℃	m/min	m/min	m/min		(%)
實施例 5	1.0	30	50	140	1840	4600	4300	2.5	6.5

B、測定方法

將所製得之纖維依台灣公告號第 477837 號說明書之方法測定以下之物性。測定項目為強、伸度、楊氏模數、微分楊氏模數、10% 伸長彈性恢復率、結晶化度、CV 值等。

所得測定結果如表 2 所示。

表 2：纖維物性

	強度	伸度	楊氏模數	微分楊氏模數	10% 伸長恢復率	結晶化度	CV 值
	cN/dtex	%	cN/dtex	cN/dtex	%	%	%
實施例 5	3.8	34.5	21	8	100	61.4	3.8

其中，微分楊氏模數，係對證據一之實施例 5 進行追試所求得之 S-S 曲線圖（圖 1），並由該 S-S 曲線圖求得之微分楊氏模數（圖 2）。

5、被異議案之構成要件與證據一技術要件之對比

被異議案之構成要件與證據一技術要件之對比係如表 3 所示

被異議案構成要件				證據一
申請項 1	(1)	纖維	PTT	PTT
	(2)	強度	3 cN/dtex 以上	3.8 cN/dtex
	(3)	楊氏模數	25 cN/dtex 以下	21 cN/dtex
	(4)	伸度 3 至 10% 下微分楊氏模數之最小值	10 cN/dtex 以下	8 cN/dtex
	(5)	彈性恢復率（10% 伸長時）	90% 以上	100%
申請項 2	(6)	結晶化度	30% 以上	64.1%
申請項 3	(6)	CV 值	5% 以下	3.8%

6、結論

依如表 3 所示，對證據一中實施例 5 進行追試所得之纖維，完全滿足被異議案之申請專利範圍第 1 至 3 項之構成要件範圍。因被異議案發明之技術內容與證據一之內容完全相同，故台灣專利公告第 477837 號不具新穎性。

圖 1.S-S 曲線圖

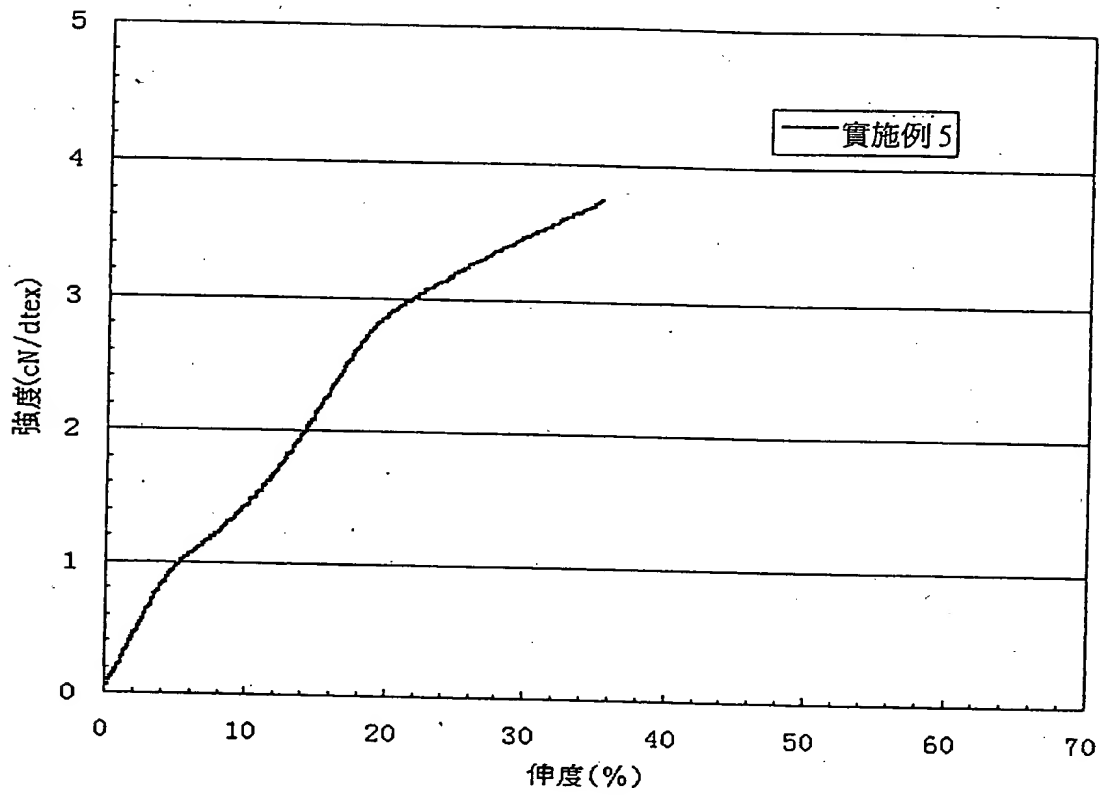
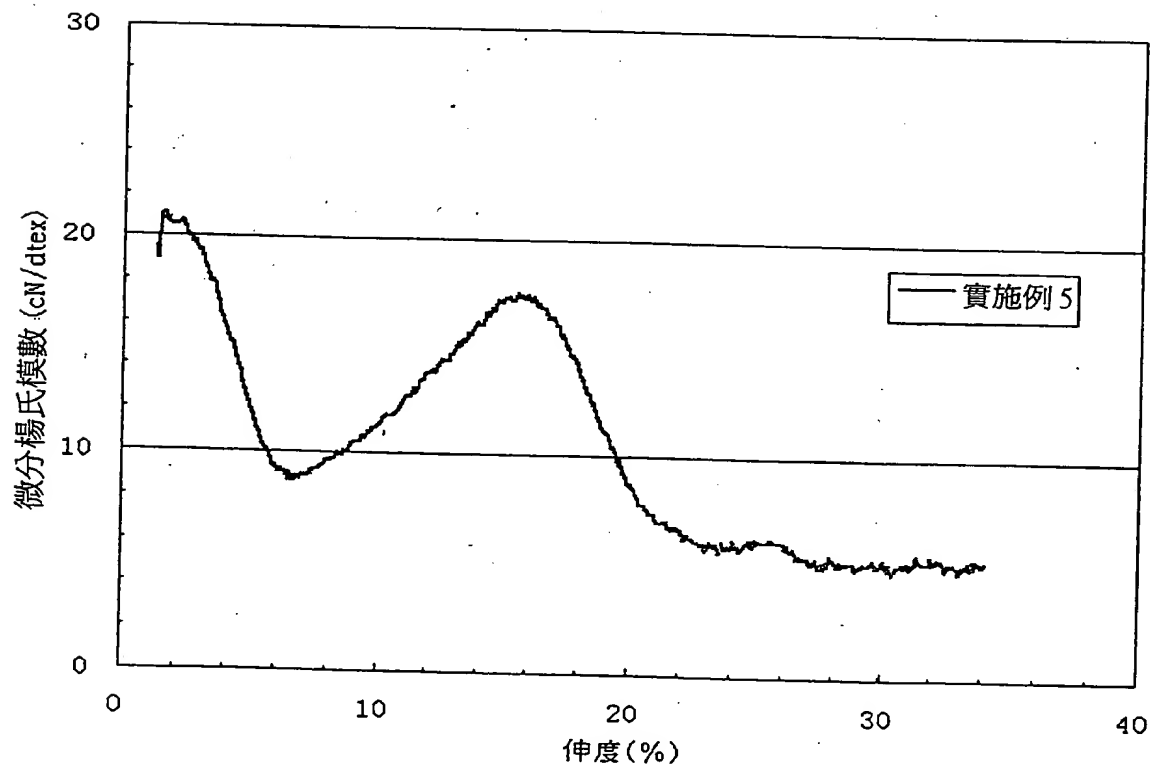
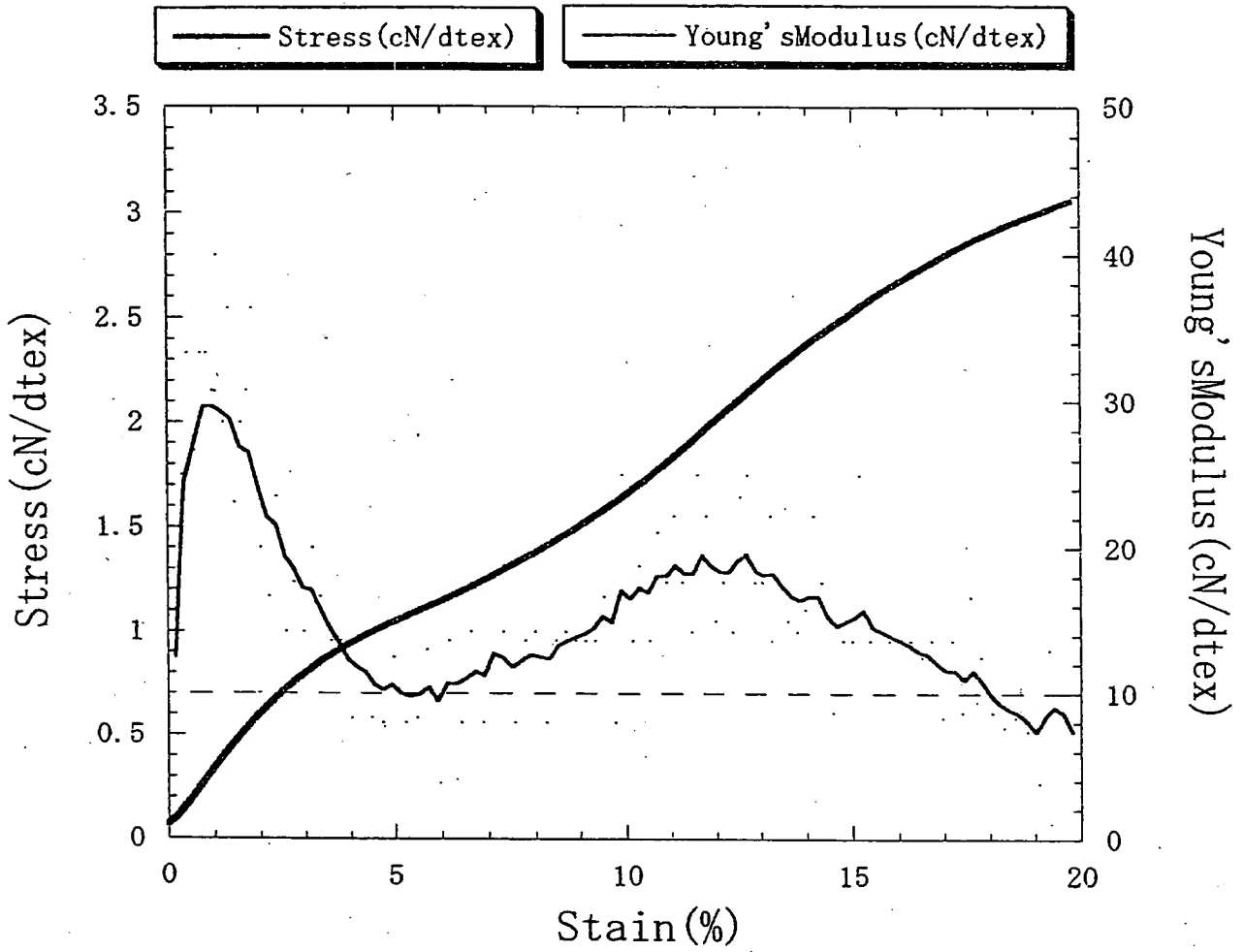


圖 2.微分楊氏模數

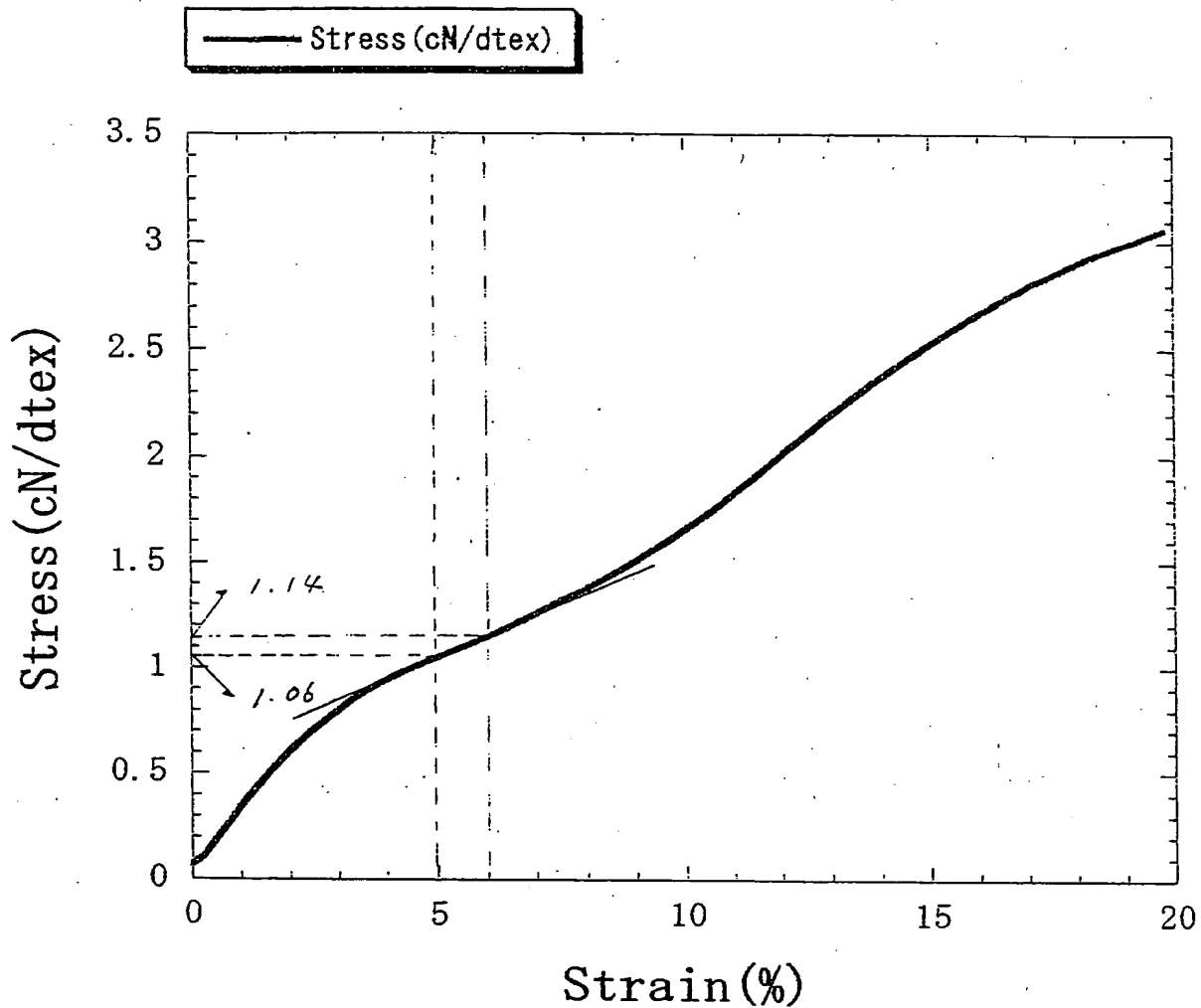


Document 1
資料 1



Document 2

資料 2



微分 弾性率 (伸度 5 ~ 6% 間)

Differential Young's modulus
(at 5 ~ 6% elongation)

$$= \frac{(1.14 - 1.06)}{(6 - 5)} \times 100$$

$$= 8 \text{ cN/dtex}$$